ALADWAA Gem

2026

SCIENCE

نماذج امتحانات الأضواء النهائية

الفصل الدراسى الثانى لعام 2026 - 2027

الصف 3 الإعدادى

الفصل الدراسى الثانى

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

Model (1)

20 Marks

1 A) Complete the following sentences:

1. The reaction of an acid with a base to form salt and water is known as ..... reaction.
2. The two factors of a genetic trait are identical in a ..... individual.
3. ..... is used to measure electrical potential difference.

B) Give a reason for:

1. The pituitary gland is called the master gland.

.....

2. Reactions between ionic compounds are fast, while reactions between covalent compounds are slow.

.....

.....

.....

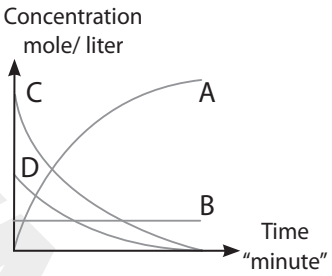
C) The opposite figure represents the relation between concentration and time for a certain reaction. Determine the following:

1. The reactants, products and catalyst.

.....

2. Write the balanced equation that represents this reaction using the given symbols.

.....



2 A) Cross out the odd word, then mention the relationship between the rest words:

1. Uranium – Cesium – Barium – Radium

.....

2. Chromosome - DNA – Protein – Enzymes

.....

3. Nature of reactants – Temperature of reactants – Concentration of products – Catalysts.

.....

B) Write the balanced chemical equation for each of the following:

1. Sodium chloride solution reacts with silver nitrate solution.

.....

2. Magnesium reacts with copper sulfate solution.

.....

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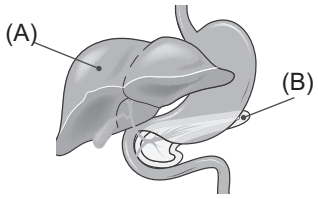
C) Look at the opposite diagram, then answer:



Name the hormones secreted by organ (B) which ... :

1. lowers the blood glucose level. (.....)
2. stimulates organ (A) to convert stored glycogen into glucose. (.....)

3 A) Choose the correct answer:

1. An electric circuit consists of a battery with an electromotive force of 3 volts connected in series with a resistance of 6 ohms. The current intensity flowing through the circuit is ..... .

   a) 2 ampere b) 1 ampere c) 1.5 ampere d) 0.5 ampere

2. The percentage of the recessive trait in the first generation resulting from the cross of two parents, one carrying a pure dominant trait and the other carrying a recessive trait, is ..... .

   a) 0% b) 25% c) 50% d) 75%

3. $Fe^{+2} \longrightarrow Fe^{+3}$. This process is called ..... .

   a) reduction b) decomposition

   c) oxidation d) oxidation and reduction together

B) Define:

1. Electric current intensity.

   .....

   .....

2. Radioactive pollution.

   .....

C) An electrical conductor has a voltage difference of 18 volts across its terminals, with a current of 2 amperes flowing through it. When connected to another power source, the current increased by 3 amperes. Calculate the potential difference across the conductor.

.....

.....

4 A) Correct the underlined words:

1. Most metals sulfates decompose by heating into metal oxide and **carbon dioxide** gas. (.....)
2. The thyroid gland secretes **growth** hormone, which regulates calcium levels in the blood. (.....)

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B) What happens if .....?

1 The mating of two pure individuals with one pair of contrasting traits.

(in terms to the first and second generations)

.....

.....

2 Reactant concentration reaches zero in a chemical reaction.

.....

C) When two tomato plants are crossed—one has red fruits and the other has yellow fruits (a trait that is always recessive). Explain, based on genetics, the genetic structure of the parents and their gametes, and illustrate the offspring resulting from their cross.

.....

.....

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Model (2)

20 Marks

1 A) Choose the correct answer:

1 ..... gland secretes hormone regulating general body growth.

a) Pituitary b) Thyroid c) Adrenal d) Reproductive

2 ..... is the physical quantity whose measuring unit is volt/ampere.

a) Electric current b) Potential difference

c) Electric charge d) Electrical resistance

3 Sodium metal replaces all the following metals in their salt solutions except ..... .

a) copper b) potassium c) magnesium d) zinc

B) 1 Calculate the electric current intensity of charges of 5400coulomb flow through a conductor in 30 seconds.

.....

2 Complete the following equation:

$Cu(OH)_2 \xrightarrow{\Delta}$ .....

C) What is the chemical formula of compound A and element B in the following reactions?

$.CuSO_4 \xrightarrow{\Delta} A + SO_3$ .....

$.A + H_2 \xrightarrow{\Delta} B + H_2O$ .....

.....

2 A) Write the scientific term:

1 An inflatable bag folded inside the steering wheel of modern cars as a safety tool during accidents. (.....)

2 The potential difference between the terminals of a battery in an open electrical circuit. (.....)

3 The increase in the amount and intensity of nuclear radiation in the surrounding environment. (.....)

B) What is the importance or use of .....?

1 Catalytic converters in modern cars.

.....

2 Variable resistor (sliding rheostat).

.....

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C) Compare between each of the following:

1. Positive catalyst and negative catalyst (in terms of the speed of chemical reaction)

Positive catalyst	Negative catalyst
.....	.....

2. Skin color in humans and the skill of playing football (in terms of trait type)

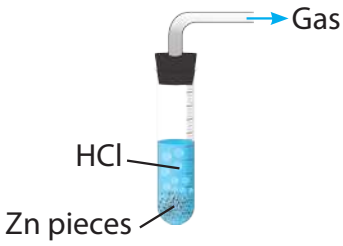
Skin color in humans	Skill of playing football
.....	.....

3 A) Put (✓) or (✗):

1. Mendel allowed pea plants to self-pollinate for several generations to ensure trait purity. ( )
2. The resistance of a conductor through which an electric current intensity of 12 ampere flows when the potential difference across its terminals is 2 volts is 6 ohms. ( )
3. When silver is added to hydrochloric acid, silver chloride is formed and hydrogen gas is evolved. ( )

B) Look at the opposite figure, then answer:

1. What is the name of the released gas? .....
2. What is the name of the formed salt? .....



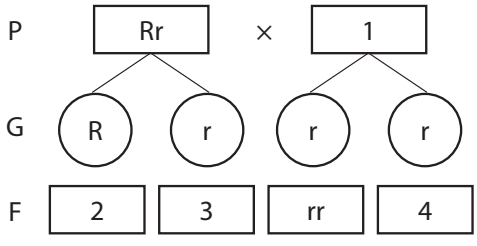
C) The opposite diagram shows cross-pollination between a pea plant with red flowers and another with white flowers. Answer the following:

1. Replace the numbers with the appropriate genetic symbols.

.....

2. State the percentage of recessive traits.

.....



4 A) Complete the following sentences:

1. During emergencies the secretion of ..... hormone increases.
2. Electric cells produce a ..... current.
3. The ..... enzyme is found in sweet potatoes increases the rate of chemical reactions.

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B) What happens when ...?

1. A lit matchstick is brought near the mouth of a test tube containing heated copper carbonate.

.....

2. Increasing the length of the wire in a sliding rheostat in an electric circuit.

(in terms to the current intensity)

.....

C) Give a reason for:

1. It is necessary for humans to include iodine in their food.

.....

.....

2. Food is stored in the refrigerator.

.....

.....

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Model (3)

20 Marks

1 A) Write the scientific term:

1. Traits that cannot be transferred from one generation to another. (.....)
2. The change in the concentration of reactants and products per unit of time.

(.....)

3. The potential difference between the two poles of the dry cell in an open electrical circuit.

(.....)

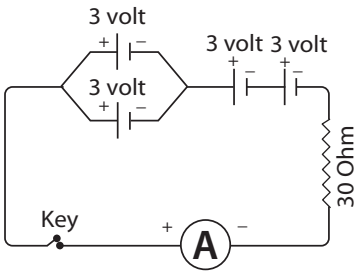
B) From the opposite electric circuit, write the number indicating each of the following:

1. The current intensity passing through the circuit.

.....

2. The current intensity passing through the circuit if all the dry cells are connected in parallel.

.....



C) Mention the use or importance for each of the following:

1. Dynamo

.....

2. Adrenaline hormone

.....

2 A) Complete the following sentences:

1. One of the effects of human exposure to high doses of radiation for short periods is the

.....

2. When sodium hydroxide solution is added to copper sulfate solution, a colorless ..... solution is formed.
3. If the work done to transfer an electric charge of 200 coulomb between two points is 2200 joule , the potential difference between the two points is equal .....

B) Study the following equations, then answer:

.....

.....

1. The name of compound A and its formula: .....
2. The color of the precipitate B and its formula. .....

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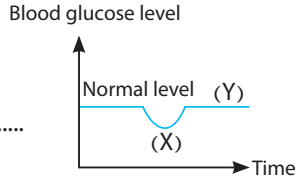
C) Look at the opposite graph, then answer:



1 What is the hormone that causes the change in blood sugar concentration from (X) to (Y)?

.....

2 The gland that secretes this hormone.

.....

3 A) Cross out the odd word, then mention the relation between the other words:

1 Calcium / Silver / Aluminum / Magnesium

.....

2 Ampere / Volt / Ohmmeter / Ohm

.....

3 Exophthalmoses / Weight loss / Tension / Continuous growth of limb bones

.....

B) The opposite diagram shows the rate of decomposition of hydrogen peroxide.

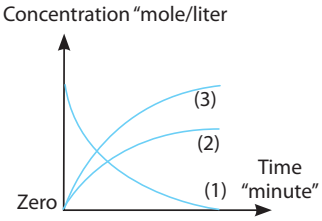
$2H_2O_2 \longrightarrow 2H_2O + O_2$

1 Write the name of the compound or element indicated by each number:

.....

.....

.....



2 The catalyst used in this reaction:

.....

C) Explain, based on genetics, the genetic structure of the individuals in the first generation resulting from the cross between a man with hybrid brown eyes (Bb) and a woman with pure colored eyes (bb). Also indicate the percentage of the offspring who will have the colored eyes trait among the resulting generation.

.....

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4 A) Put (✓) or (✗):

1. The genetic structure of a tall pea plant with pure red flowers is (TTRR). ( )
2. The maximum safe radiation dose for workers in the field of radiation is 1 millisievert per year. ( )
3. The reaction time of iron rusting is shorter than that of soap production. ( )

B) Write the number that indicates to each of the following:

1. The number of electric cells that make up a battery with an electromotive force (e.m.f.) of 9 volt, knowing that all the cells are connected in series and the e.m.f. of each cell is 1.5 volt.

.....

2. The hereditary traits that Mendel selected for his experiments.

.....

C) You have three electric cells, each with an e.m.f. of 3 volt, a fixed resistance of 10 ohms, and an ammeter. How can you connect them to make the ammeter read ...?

1. 0.6 ampere
2. 0.9 ampere

1 .....

2 .....

.....

.....

.....

.....

.....

.....

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Model (4)

20 Marks

1 A) Correct the underlined words:

1. The airbag contains ....., which decomposes when there is a sudden change in speed.
2. A copper wire with a length of 2 meters carries a current of 10 ampere. If the length of the wire becomes 4 meter while the cross-sectional area remains constant, the current intensity passing through it becomes .....
3. A deficiency of ..... in food leads to a deficiency of the thyroxine hormone.

B) What is meant by .....?

1. Endocrine Glands.

.....

2. Neutralization Reaction.

.....

C) Explain with balanced symbolic equations:

1. The effect of heat on copper carbonate (green).

.....

2. The reaction of dilute hydrochloric acid with sodium carbonate.

.....

2 A) Cross out the odd word:

1. Skin color – Blood type – Number of fingers – Swimming

.....

2. Destruction of bone marrow – Changes in the structure of sex chromosomes – Destruction of the nervous system – Destruction of the digestive system

.....

B) Mention the roles of the following scientists:

1. Badel and Tatum

.....

.....

2. Watson and Crick

.....

.....

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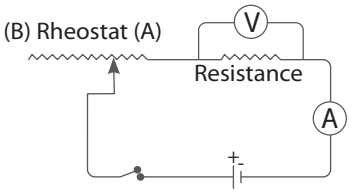
C) In the opposite electric circuit , what happens to each of the following when the rheostat slider is moved from (A) to (B).

1 Ammeter reading and voltmeter reading

.....

2 Resistance value

.....



3 A) Mention one example for each of the following:

1 A gas that causes a glowing matchstick.

.....

2 A type of radiation activity released during nuclear reactions that can be controlled.

.....

3 A hormone responsible for regulating calcium levels in the blood.

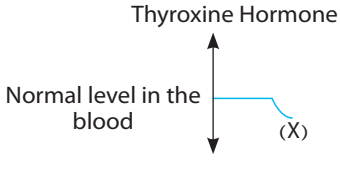
.....

B) A conductor with a resistance of 1000 ohm is connected to a power source with a potential difference of 100 volts. Calculate the amount of charge passing through the conductor during a time of 100 seconds.

.....

.....

C) The diagram shows a hormone secreted by the thyroid gland into the blood. What disease results from the hormone reaching point (X)



.....

4 A) Correct the underlined words:

1 Sodium nitrate decomposes with heat, and **nitrogen** gas is released. (.....)

2 The first part to be affected when a person is exposed to a large dose of radiation over a short period of time is the **stomach**. (.....)

3 **An ohmmeter** is used to control the potential difference between the two ends of a conductor in an electrical circuit. (.....)

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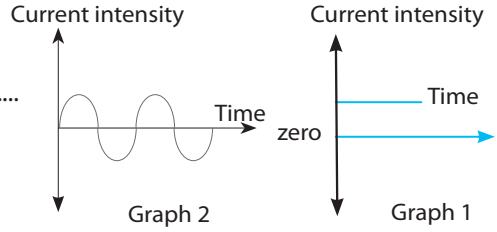
(B) Study the two graphs shown and determine which graph represents:

1. A current that is not used in the electroplating process.

.....

2. A current produced from the conversion of chemical energy into electrical energy.

.....



(C) Explain, based on genetic principles, the result of mating a male and a female fruit fly, both with long wings. The result was 45 long-winged individuals and 15 short-winged individuals, known that the gene for long wings is represented by the symbol (T) and the gene for short wings is represented by the symbol (t):

.....

.....

.....

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.....

.....

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Model (5)

20 Marks

1 A) Complete the following sentences:

1. The simple goitre disease is caused by a deficiency in the secretion of **growth** hormone. (.....)
2. The unit volt.ampere.second is a unit for **measuring electric potential difference.** (.....)
3. Aluminium reacts with dilute hydrochloric acid after a period of time due to the presence of a layer of **aluminium chloride.** (.....)

B) Give a reason for:

1. The ability to roll the tongue is a dominant trait in humans.

.....

.....

2. Radioactive wastes are buried far away from groundwater sources.

.....

C) Write the balanced symbolic equation for each of the following:

1. Thermal decomposition of sodium nitrate:

.....

2. The reaction between sodium and water:

.....

2 A) Write the scientific term:

1. The state of an electric conductor that shows the transfer of electricity from or to it when it is connected to another conductor (.....)
2. A substance that changes the rate of a chemical reaction without being changed itself. (.....)
3. Substances or chemical messengers that regulate and organize biological activities in a living organism. (.....

B) What happens when .....?

1. Mendel left the stigmas of pea plant flowers uncovered during his study of genetic traits.

.....

2. The flow of electrons in opposite directions in an electric circuit.

.....

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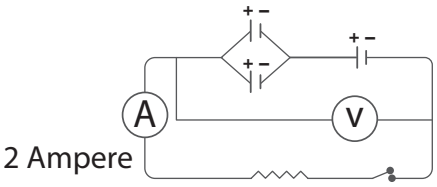
C) In the given diagram, if the cells are identical, calculate:



1 Voltmeter reading

.....

2 The electromotive force (e.m.f) of each cell = ...

3 A) Complete the following sentences:

1 The phenomenon of radioactivity was discovered by the scientist .....

2 The reaction $O^{-2} \longrightarrow O^{-} + e^{-}$ represents a process of .....

3 The trait of attached earlobes is a ..... trait in humans.

B) Compare between each of the following:

1 The oxidizing agent and the reducing agent (in terms of loss or gain of electrons).

Oxidizing agent	Reducing agent
.....	.....

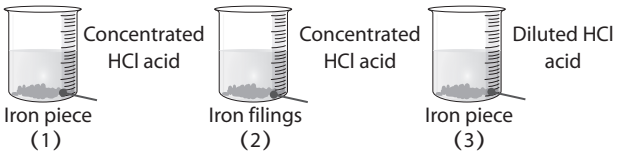
2 The pure individual and the hybrid individual (in terms of definition).

Pure individual	Hybrid individual
.....	.....

C) Look at the following reactions, then answer:

1 Which of these reactions is the fastest (1, 2, or 3)?

.....



2 The two factors affecting the speed of this reaction:

.....

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4 A) Choose the correct answer:

1 …….. hormone responsible for the appearance of secondary sexual characteristics in females.

a- Estrogen b- Testosterone c- Insulin d- Progesterone

2 …….. is the international unit that measures the radiation absorbed by the human body.

a- Joule b- Meter c- Sievert d- Coulomb

3 If the genetic structure of a child is (bb), the possible genetic structure of the parents is ..... .

a- Bb × BB b- bb × BB c- Bb × bb d- BB × BB

B) A conductor carries a current of 0.2 ampere and the potential difference across it is 10 volt. Calculate:

1 The amount of charge passing through it in 5 minutes:

.....

2 The work done in transferring 100 coulomb of charge:

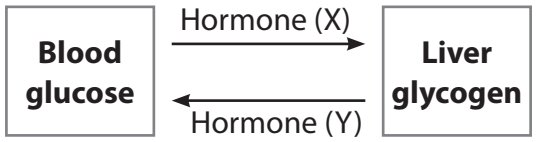
.....

C) Look at the opposite diagram, then answer:

1 What are the names of hormone (X) and hormone (Y)?

.....

.....



2 What disease results from a deficiency of hormone (Y)?

.....

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2026

SCIENCE

إجابات نماذج امتحانات الأضواء النهائية

الفصل الدراسى الثانى لعام 2026 - 2027

الصف 3 الإعدادى

الفصل الدراسى الثانى

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

Model (1)

20 Marks

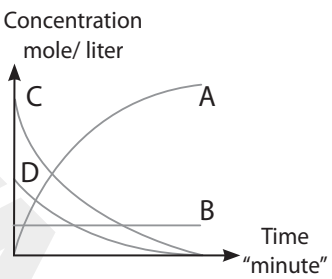
1 A) Complete the following sentences:

1. The reaction of an acid with a base to form salt and water is known as **neutralization** reaction.
2. The two factors of a genetic trait are identical in a **pure** individual.
3. **Voltmeter** is used to measure electrical potential difference.

B) Give a reason for:

1. The pituitary gland is called the master gland.
   - **Because it secretes hormones that regulate the activities of most other endocrine glands.**
2. Reactions between ionic compounds are fast, while reactions between covalent compounds are slow.
   - **Because ionic compounds dissociate into ions in water, allowing reactions to occur between the ions directly, while covalent compounds do not dissociate into ions, and reactions occur between molecules.**

C) The opposite figure represents the relation between concentration and time for a certain reaction. Determine the following:



1. The reactants, products and catalyst.
   Reactants (C,D) - Products (A) - Catalyst (B)
2. Write the balanced equation that represents this reaction using the given symbols.
   $2C + D \xrightarrow{B} A$

2 A) Cross out the odd word, then mention the relationship between the rest words:

1. Uranium – Cesium – Barium – Radium
   - **(Barium) (Radioactive elements)**
2. Chromosome - DNA – Protein – Enzymes
   - **(Enzymes) (Structure of chromosome)**
3. Nature of reactants – Temperature of reactants – Concentration of products – Catalysts.
   - **Concentration of products) (Factors affecting the speed of reaction)**

B) Write the balanced chemical equation for each of the following:

1. Sodium chloride solution reacts with silver nitrate solution.
   $NaCl + AgNO_3 \rightarrow NaNO_3 + AgCl\downarrow$
2. Magnesium reacts with copper sulfate solution.
   $Mg + CuSO_4 \rightarrow MgSO_4 + Cu$

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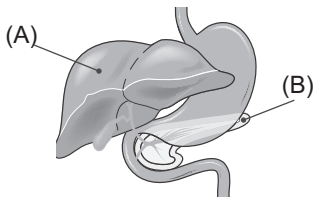
C) Look at the opposite diagram, then answer:



Name the hormones secreted by organ (B) which ... :

1. lowers the blood glucose level. (**Insulin hormone**)
2. stimulates organ (A) to convert stored glycogen into glucose. (**Glucagon hormone**)

3 A) Choose the correct answer:

1. An electric circuit consists of a battery with an electromotive force of 3 volts connected in series with a resistance of 6 ohms. The current intensity flowing through the circuit is ..... .

   a) 2 ampere b) 1 ampere c) 1.5 ampere **d) 0.5 ampere**

2. The percentage of the recessive trait in the first generation resulting from the cross of two parents, one carrying a pure dominant trait and the other carrying a recessive trait, is ..... .

   a) 0% b) 25% c) 50% d) 75%

3. $Fe^{+2} \longrightarrow Fe^{+3}$. This process is called ..... .

   a) reduction b) decomposition

   c) oxidation d) oxidation and reduction together

B) Define:

1. Electric current intensity.

   It is the quantity of electricity in coulomb or the electric charges flowing through a cross-section of the conductor in one second

2. Radioactive pollution.

   - It is the increase in nuclear radiation levels in the surrounding environment.

C) An electrical conductor has a voltage difference of 18 volts across its terminals, with a current of 2 amperes flowing through it. When connected to another power source, the current increased by 3 amperes. Calculate the potential difference across the conductor.

Resistance (R) = $\frac{V}{I} = \frac{18}{2} = 9$ ohms

(V) = R × I = 9 × 5 = 45 volts

4 A) Correct the underlined words:

1. Most metals sulfates decompose by heating into metal oxide and **carbon dioxide** gas.

   (**Sulphur trioxide**)

2. The thyroid gland secretes **growth** hormone, which regulates calcium levels in the blood.

   (**Calcitonin**)

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B) What happens if .....?

1 The mating of two pure individuals with one pair of contrasting traits.

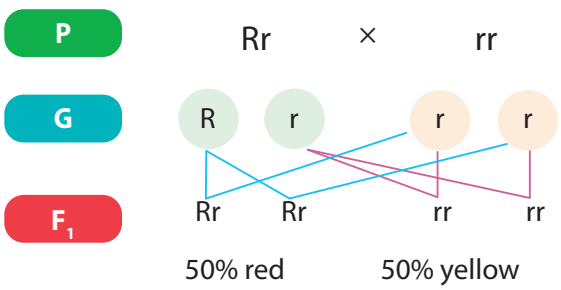
(in terms to the first and second generations)

– The dominant trait appears in the first generation at a rate of 100%, then both traits are inherited together in the second generation at a ratio of 3 (dominant trait) : 1 (recessive trait)

2 Reactant concentration reaches zero in a chemical reaction.

- The reaction stops, and the product concentration reaches 100%.

C) When two tomato plants are crossed—one has red fruits and the other has yellow fruits (a trait that is always recessive). Explain, based on genetics, the genetic structure of the parents and their gametes, and illustrate the offspring resulting from their cross.



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Model (2)

20 Marks

1 A) Choose the correct answer:

1. ..... gland secretes hormone regulating general body growth.

   a) Pituitary b) Thyroid c) Adrenal d) Reproductive

2. ..... is the physical quantity whose measuring unit is volt/ampere.

   a) Electric current b) Potential difference

   c) Electric charge **d) Electrical resistance**

3. Sodium metal replaces all the following metals in their salt solutions except ..... .

   a) copper **b) potassium** c) magnesium d) zinc

B) 1 Calculate the electric current intensity of charges of 5400coulomb flow through a conductor in 30 seconds.

$$I = \frac{q}{t} = \frac{5400}{30} = 180 \text{ amp.}$$

2 Complete the following equation:

$$Cu(OH)_2 \xrightarrow{\Delta} CuO + H_2O$$

C) What is the chemical formula of compound A and element B in the following reactions?

$$CuSO_4 \xrightarrow{\Delta} A + SO_3$$

$$A + H_2 \xrightarrow{\Delta} B + H_2O$$

A: (CuO) **B: (Cu)**

2 A) Write the scientific term:

1. An inflatable bag folded inside the steering wheel of modern cars as a safety tool during accidents. (**Airbag**)
2. The potential difference between the terminals of a battery in an open electrical circuit. (**Electromotive force**)
3. The increase in the amount and intensity of nuclear radiation in the surrounding environment. (**Radioactive pollution**)

B) What is the importance or use of .....?

1. Catalytic converters in modern cars.
   - To treat harmful gases produced from fuel combustion before releasing them.
2. Variable resistor (sliding rheostat).
   - To control the electric current intensity and the potential difference in a circuit.

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C) Compare between each of the following:

1 Positive catalyst and negative catalyst (in terms of the speed of chemical reaction)

Positive catalyst	Negative catalyst
Increases the speed of a chemical reaction	Decreases the speed of a chemical reaction

2 Skin color in humans and the skill of playing football (in terms of trait type)

Skin color in humans	Skill of playing football
Genetic trait	Acquired trait

3 A) Put (✓) or (✗):

1 Mendel allowed pea plants to self-pollinate for several generations to ensure trait purity. (✓)

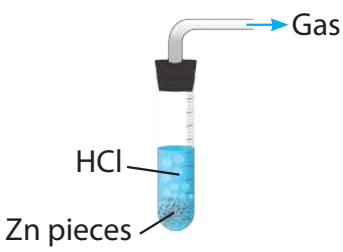
2 The resistance of a conductor through which an electric current intensity of 12 ampere flows when the potential difference across its terminals is 2 volts is 6 ohms. (✗)

3 When silver is added to hydrochloric acid, silver chloride is formed and hydrogen gas is evolved. (✗)

B) Look at the opposite figure, then answer:

1 What is the name of the released gas? **Hydrogen gas.**

2 What is the name of the formed salt? **Zinc chloride.**



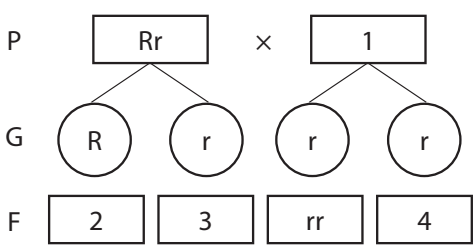
C) The opposite diagram shows cross-pollination between a pea plant with red flowers and another with white flowers. Answer the following:

1 Replace the numbers with the appropriate genetic symbols.

1-(rr) 2-(Rr) 3-(Rr) 4-(rr)

2 State the percentage of recessive traits.

50%



4 A) Complete the following sentences:

1 During emergencies the secretion of **adrenaline** hormone increases.

2 Electric cells produce a **direct** current.

3 The **oxidase** enzyme is found in sweet potatoes increases the rate of chemical reactions.

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B) What happens when ...?

1. A lit matchstick is brought near the mouth of a test tube containing heated copper carbonate.
   it is extinguished due to the release of carbon dioxide gas.

2. Increasing the length of the wire in a sliding rheostat in an electric circuit.
   (in terms to the current intensity)
   The electric current intensity flowing through the circuit decreases.

C) Give a reason for:

1. It is necessary for humans to include iodine in their food.
   Because iodine is involved in the formation of the thyroxine hormone, which plays an important role in the food assimilation processes.

2. Food is stored in the refrigerator.
   Because the low temperature in the refrigerator slows down the chemical reactions caused by bacteria, which leads to spoiling of food.

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Model (3)

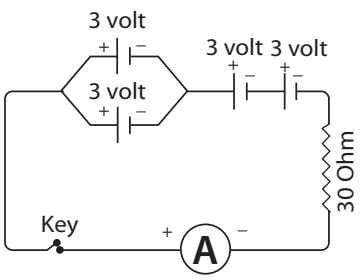
20 Marks

1 A) Write the scientific term:

1. Traits that cannot be transferred from one generation to another. (**Acquired traits**)
2. The change in the concentration of reactants and products per unit of time. (**Rate of chemical reaction**)
3. The potential difference between the two poles of the dry cell in an open electrical circuit. (**Electromotive force**)

B) From the opposite electric circuit, write the number indicating each of the following:

1. The current intensity passing through the circuit.
   (0.3 amperes)
2. The current intensity passing through the circuit if all the dry cells are connected in parallel.
   (0.1 amperes)



C) Mention the use or importance for each of the following:

1. Dynamo
   - It converts kinetic energy into electrical energy – generates alternating electric current.
2. Adrenaline hormone
   - It stimulates various body organs for a quick response in emergency situations.

2 A) Complete the following sentences:

1. One of the effects of human exposure to high doses of radiation for short periods is the **damage of bone marrow**.
2. When sodium hydroxide solution is added to copper sulfate solution, a colorless **sodium sulfate** solution is formed.
3. If the work done to transfer an electric charge of 200 coulomb between two points is 2200 joule , the potential difference between the two points is equal **11 volt**.

B) Study the following equations, then answer:

$$NaOH + HCl \longrightarrow \boxed{A} + H_2O$$

$$\boxed{A} + AgNo_3 \longrightarrow NaNO_3 + \boxed{B}\downarrow$$

1. The name of compound A and its formula: **Sodium chloride (NaCl)**
2. The color of the precipitate B and its formula. **Silver chloride (AgCl) (white ppt)**

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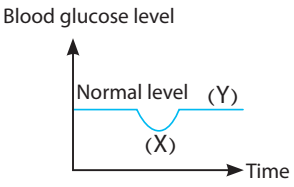
C) Look at the opposite graph, then answer:



1. What is the hormone that causes the change in blood sugar concentration from (X) to (Y)?
   (Glucagon hormone)

2. The gland that secretes this hormone.
   (Pancreas gland)

3 A) Cross out the odd word, then mention the relation between the other words:

1. Calcium / Silver / Aluminum / Magnesium
   (Silver - Elements that can replace hydrogen)

2. Ampere / Volt / Ohmmeter / Ohm
   (Ohmmeter - Units of measurement)

3. Exophthalmoses / Weight loss / Tension / Continuous growth of limb bones
   (Continuous growth of limb bones - Symptoms of exophthalmic goiter)

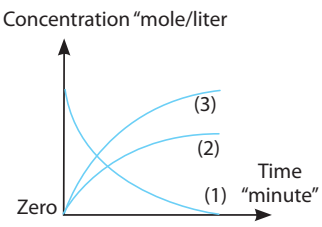
B) The opposite diagram shows the rate of decomposition of hydrogen peroxide.

$2H_2O_2 \longrightarrow 2H_2O + O_2$

1. Write the name of the compound or element indicated by each number:
   (1) $2H_2O_2$ – Hydrogen peroxide

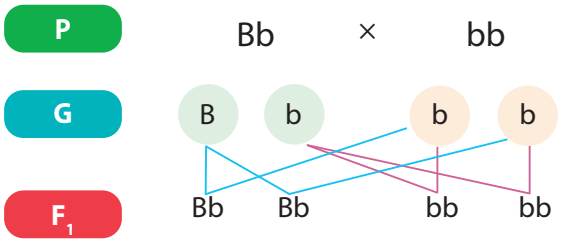
   (2) O_2 – Oxygen

   (3) $2H_2O$ – Water



2. The catalyst used in this reaction:
   manganese dioxide . (MnO_2)

C) Explain, based on genetics, the genetic structure of the individuals in the first generation resulting from the cross between a man with hybrid brown eyes (Bb) and a woman with pure colored eyes (bb). Also indicate the percentage of the offspring who will have the colored eyes trait among the resulting generation.



50% carry the colored eyes trait.

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4 A) Put (✓) or (✗):

1. The genetic structure of a tall pea plant with pure red flowers is (TTRR). (✓)
2. The maximum safe radiation dose for workers in the field of radiation is 1 millisievert per year. (✗)
3. The reaction time of iron rusting is shorter than that of soap production. (✗)

B) Write the number that indicates to each of the following:

1. The number of electric cells that make up a battery with an electromotive force (e.m.f.) of 9 volt, knowing that all the cells are connected in series and the e.m.f. of each cell is 1.5 volt.

   6 cells

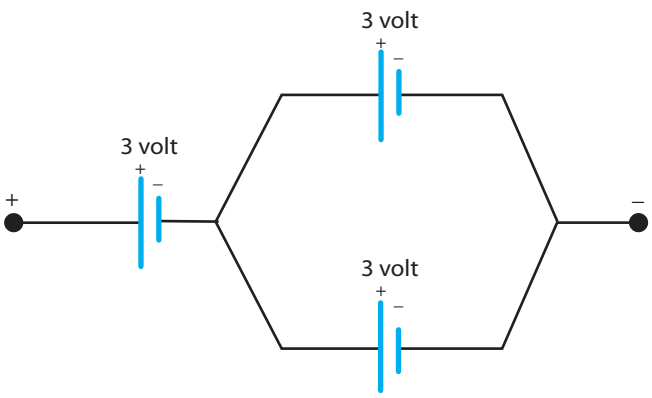
2. The hereditary traits that Mendel selected for his experiments.

   7 traits

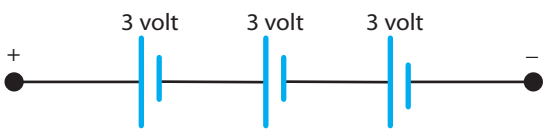
C) You have three electric cells, each with an e.m.f. of 3 volt, a fixed resistance of 10 ohms, and an ammeter. How can you connect them to make the ammeter read ...?

1. 0.6 ampere
2. 0.9 ampere

1 V = R × I = 10 × 0.6 = 6 volts



2 V = R × I = 10 × 0.9 = 9 volts



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Model (4)

20 Marks

1 A) Correct the underlined words:

1. The airbag contains **sodium azide**, which decomposes when there is a sudden change in speed.
2. A copper wire with a length of 2 meters carries a current of 10 ampere. If the length of the wire becomes 4 meter while the cross-sectional area remains constant, the current intensity passing through it becomes **5 ampere**.
3. A deficiency of **iodine** in food leads to a deficiency of the thyroxine hormone.

B) What is meant by .....?

1. Endocrine Glands.
   - They are ductless glands that secrete their hormone secretions directly into the blood.
2. Neutralization Reaction.
   - It is a reaction between an acid and a base to form a salt and water.

C) Explain with balanced symbolic equations:

1. The effect of heat on copper carbonate (green).
   $CuCO_3 \xrightarrow{\Delta} CuO + CO_2\uparrow$
2. The reaction of dilute hydrochloric acid with sodium carbonate.
   $Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2\uparrow$

2 A) Cross out the odd word:

1. Skin color – Blood type – Number of fingers – Swimming
   - (Swimming)
2. Destruction of bone marrow – Changes in the structure of sex chromosomes – Destruction of the nervous system – Destruction of the digestive system
   - Changes in the structure of sex chromosomes

B) Mention the roles of the following scientists:

1. Badel and Tatum
   - They discovered how genes control the expression of the genetic traits.
2. Watson and Crick
   - They proposed the model of the DNA molecule, which consists of two strands twisted around each other in a double helix structure.

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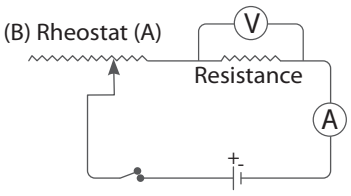
C) In the opposite electric circuit , what happens to each of the following when the rheostat slider is moved from (A) to (B).



1. Ammeter reading and voltmeter reading

   Both the ammeter and voltmeter readings decrease.

2. Resistance value

   The resistance value increases.

3 A) Mention one example for each of the following:

1. A gas that causes a glowing matchstick.

   (Oxygen gas)

2. A type of radiation activity released during nuclear reactions that can be controlled.

   (Artificial radiation activity)

3. A hormone responsible for regulating calcium levels in the blood.

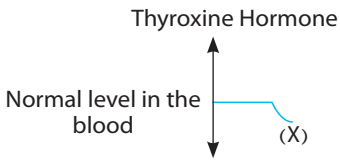
   (Calcitonin hormone)

B) A conductor with a resistance of 1000 ohm is connected to a power source with a potential difference of 100 volts. Calculate the amount of charge passing through the conductor during a time of 100 seconds.

Current intensity (I) = $\frac{\text{potential difference (V)}}{\text{Resistance (R)}} = \frac{100}{1000}$ = 0.1 amperes

Quantity of charge (q) = Current intensity (I) × Time (t) = 0.1 × 100 = 10 coulomb

C) The diagram shows a hormone secreted by the thyroid gland into the blood. What disease results from the hormone reaching point (X)



- Simple goiter disease

4 A) Correct the underlined words:

1. Sodium nitrate decomposes with heat, and **nitrogen** gas is released. (**Oxygen**)
2. The first part to be affected when a person is exposed to a large dose of radiation over a short period of time is the **stomach**. (**Bone marrow**)
3. **An ohmmeter** is used to control the potential difference between the two ends of a conductor in an electrical circuit. (**Sliding rheostat**).

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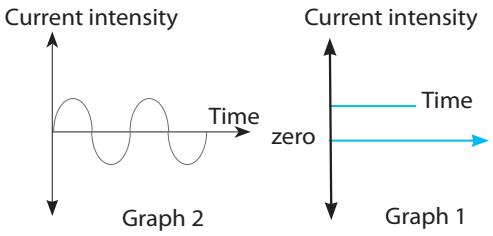
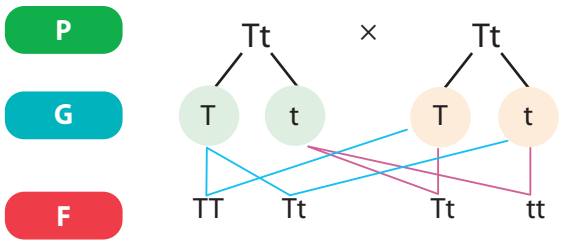
(B) Study the two graphs shown and determine which graph represents:

1. A current that is not used in the electroplating process. **(Graph 2)**

2. A current produced from the conversion of chemical energy into electrical energy. **(Graph 1)**



(C) Explain, based on genetic principles, the result of mating a male and a female fruit fly, both with long wings. The result was 45 long-winged individuals and 15 short-winged individuals, known that the gene for long wings is represented by the symbol (T) and the gene for short wings is represented by the symbol (t):



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Model (5)

20 Marks

1 A) Complete the following sentences:

1. The simple goitre disease is caused by a deficiency in the secretion of **growth** hormone.
   (Thyroxine)
2. The unit volt.ampere.second is a unit for **measuring electric potential difference.**
   (Work done)
3. Aluminium reacts with dilute hydrochloric acid after a period of time due to the presence of a layer of **aluminium chloride.** **(Aluminium oxide)**

B) Give a reason for:

1. The ability to roll the tongue is a dominant trait in humans.
   – Because the gene for tongue rolling is dominant over the gene for non-rolling when both are present.
2. Radioactive wastes are buried far away from groundwater sources.
   – To prevent radioactive contamination of the water.

C) Write the balanced symbolic equation for each of the following:

1. Thermal decomposition of sodium nitrate:

$$2NaNO_3 \xrightarrow{\Delta} 2NaNO_2 + O_2\uparrow$$

2. The reaction between sodium and water:

$$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow + Heat$$

2 A) Write the scientific term:

1. The state of an electric conductor that shows the transfer of electricity from or to it when it is connected to another conductor
   (Electric potential of a conductor)
2. A substance that changes the rate of a chemical reaction without being changed itself.
   (Catalyst)
3. Substances or chemical messengers that regulate and organize biological activities in a living organism. **(Hormones**

B) What happens when ……?

1. Mendel left the stigmas of pea plant flowers uncovered during his study of genetic traits.
   Cross-pollination will occur.
2. The flow of electrons in opposite directions in an electric circuit.
   An alternating electric current is generated.

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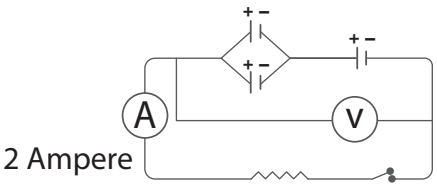
C) In the given diagram, if the cells are identical, calculate:

1 Voltmeter reading

V = R × I = 4 × 2 = 8 volt



2 The electromotive force (e.m.f) of each cell = **4 volts**

3 A) Complete the following sentences:

1 The phenomenon of radioactivity was discovered by the scientist …. **Henri Becquerel** ….

2 The reaction $O^{-2} \longrightarrow O^{-} + e^{-}$ represents a process of ……**oxidation**…….

3 The trait of attached earlobes is a ……. **recessive** ……. trait in humans.

B) Compare between each of the following:

1 The oxidizing agent and the reducing agent (in terms of loss or gain of electrons).

Oxidizing agent	Reducing agent
It is the element that gains one electron or more.	**It is the substance that loses one electron or more.**

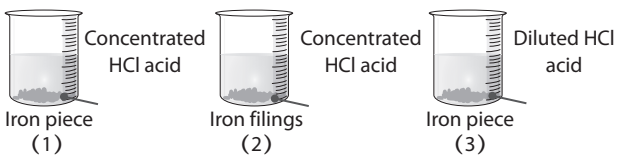
2 The pure individual and the hybrid individual (in terms of definition).

Pure individual	Hybrid individual
It is the individual that carries two identical genes for either the dominant trait or the recessive trait.	**It is the individual that carries two different genes one for dominant trait and the other for the recessive trait.**

C) Look at the following reactions, then answer:

1 Which of these reactions is the fastest (1, 2, or 3)?

(Number 2)



2 The two factors affecting the speed of this reaction:

– Surface area exposed to the reaction – Concentration of the reactants

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4 A) Choose the correct answer:

1. …….. hormone responsible for the appearance of secondary sexual characteristics in females.

   a- Estrogen b- Testosterone c- Insulin d- Progesterone

2. …….. is the international unit that measures the radiation absorbed by the human body.

   a- Joule b- Meter **c- Sievert** d- Coulomb

3. If the genetic structure of a child is (bb), the possible genetic structure of the parents is ..... .

   a- Bb × BB b- bb × BB **c- Bb × bb** d- BB × BB

B) A conductor carries a current of 0.2 ampere and the potential difference across it is 10 volt. Calculate:

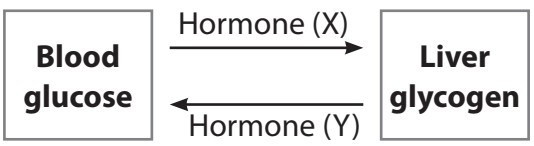
1. The amount of charge passing through it in 5 minutes:

   q = I × t = 0.2 × 5 × 60 = 60 coulomb

2. The work done in transferring 100 coulomb of charge:

   W = V × q = 10 × 100 = 1000 Joule

C) Look at the opposite diagram, then answer:



1. What are the names of hormone (X) and hormone (Y)?

   (X) = Insulin **(Y) = Glucagon**

2. What disease results from a deficiency of hormone (Y)?

   Diabetes mellitus disease.

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